WHAT IS CLAIMED IS:

1. A composition for inducing the proliferation of a progenitor cell comprising a culture medium supplemented with at least one growth factor.

2. A composition for inducing the proliferation of a progenitor cell comprising a culture medium supplemented with at least one growth factor selected from the group of epidermal growth factor, amphiregulin, transforming growth factor alpha and insulin-like growth factor-1.

3. A composition for inducing the proliferation of a progenitor cell according to Claim 1, wherein the culture medium is supplemented with epidermal growth factor.

4. A composition for inducing the proliferation of a progenitor cell according to Claim 1, wherein the culture medium is supplemented with transforming growth factor alpha.

5. A progenitor cell comprising a cell isolated from a mammal which is cultured in vitro, and which, in the presence of at least one growth factor, proliferates and is induced to differentiate.

6. A progenitor cell according to Claim 5, wherein the cell is isolated from a mammal and is cultured in vitro,

and which, in the presence of epidermal growth factor, proliferates and is induced to differentiate.

7. A progenitor cell according to Claim 5, wherein the cell is isolated from a mammal and is cultured in vitro, and which, in the presence of transforming growth factor alpha, proliferates and is induced to differentiate.

8. A progenitor cell according to Claim 5, wherein the cell is isolated from a mouse and is cultured in vitro, and which, in the presence of epidermal growth factor, proliferates and is induced to differentiate.

9. A progenitor cell according to Claim 5, wherein the cell is isolated from a mouse and is cultured in vitro, and which, in the presence of transforming growth factor alpha, proliferates and is induced to differentiate.

10. A progenitor cell according to Claim 5, wherein the cell is isolated from a human and is cultured in vitro, and which, in the presence of epidermal growth factor, proliferates and is induced to differentiate.

11. A progenitor cell according to Claim 5, wherein the cell is isolated from a human and is cultured in vitro, and which, in the presence of transforming growth factor alpha, proliferates and is induced to differentiate.

12. A progenitor cell according to Claim 5, wherein the cell is transplanted into a human, expresses the phenotypic properties of neurons, and forms neuronal connections with the host's neural tissue.

13. A progenitor cell according to Claim 12, wherein the cell exhibits immunoreactivity to neurotransmitters or neurotransmitter-synthesizing enzymes.

14. A progenitor cell according to Claim 13, wherein the immunoreactivity is directed to GABA.

15. A progenitor cell according to Claim 13, wherein the immunoreactivity is directed to substance P.

16. A progenitor cell according to Claim 13, wherein the immunoreactivity is directed to glutamic acid decarboxylase.

17. A method for the <u>in vitro</u> proliferation of progenitor cells comprising the steps of;

(a) isolating a cell from a mammal,

(b) exposing the cell to a culture medium containing a growth factor,

(c) inducing the cell to proliferate, and

(d) inducing the cell to differentiate.

18. A method for the in vitro proliferation of progenitor cells according to Claim 17, wherein the cell is isolated from a mouse, and exposed to a culture medium containing epidermal growth factor.

19. A method for the in vitro proliferation of progenitor cells according to Claim 17, wherein the cell is isolated from a mouse, and exposed to a culture medium containing transforming growth factor alpha.

20. A method for the in vitro proliferation of progenitor cells according to Claim 17, wherein the cell is isolated from a human, and exposed to a culture medium containing epidermal growth factor.

21. A method for the in vitro proliferation of progenitor cells according to Claim 17, wherein the cell is isolated from a human, and exposed to a culture medium containing transforming growth factor alpha.

22. A method for the in situ proliferation of progenitor cells wherein the cell is induced with a growth factor or pharmaceutical composition to proliferate and differentiate in situ.

23. A method for the in situ proliferation of progenitor cells according to Claim 22, wherein the growth factor is EGF.

24. A method for the in situ proliferation of progenitor cells according to Claim 22, wherein the growth factor is TGFα.

25. A method for the in situ proliferation of progenitor cells according to Claim 22, wherein the growth factor is supplied by an apparatus implanted in proximity to the progenitor cells.

26. A method for the in situ proliferation of progenitor cells according to Claim 22, wherein the growth factor is supplied by other cells implanted in proximity to the progenitor cells.

27. A method for the in vivo transplantation of progenitor cells which comprises implanting, into a mammal, cells which have been allowed to (1) proliferate and differentiate in vitro, and are then transplanted, (2) proliferate in vitro, are then transplanted, then further proliferate and differentiate in vivo, or (3) proliferate in vitro, are transplanted and differentiate in vivo.

28. A method for the in vivo transplantation of progenitor cells according to Claim 27, wherein cells which have been cultured in the presence of epidermal growth factor are implanted into a mouse.

29. A method for the *in vivo* transplantation of progenitor cells according to Claim 27, wherein cells which have been cultured in the presence of transforming growth factor alpha are implanted into a mouse.

30. A method for the *in vivo* transplantation of progenitor cells according to Claim 27, wherein cells which have been cultured in the presence of epidermal growth factor are implanted into a human.

31. A method for the *in vivo* transplantation of progenitor cells according to Claim 27, wherein cells which have been cultured in the presence of transforming growth factor alpha are implanted into a human.

32. A method for the *in vivo* transplantation of progenitor cells according to Claim 27, wherein the transplanted progenitor cells act as a tissue graft.

33. A method for the *in vivo* transplantation of progenitor cells according to Claim 28, wherein the transplanted progenitor cells act as a tissue graft.

34. A method for the *in vivo* transplantation of progenitor cells according to Claim 29, wherein the transplanted progenitor cells act as a tissue graft.

35. A method for the in vivo transplantation of progenitor cells according to Claim 30, wherein the transplanted progenitor cells act as a tissue graft.

36. A method for the in vivo transplantation of progenitor cells according to Claim 31, wherein the transplanted progenitor cells act as a tissue graft.

37. A method for the in vivo transplantation of progenitor cells according to Claim 27, wherein the transplanted progenitor cells act as a neural graft.

38. A method for the in vivo transplantation of progenitor cells according to Claim 28, wherein the transplanted progenitor cells act as a neural graft.

39. A method for the in vivo transplantation of progenitor cells according to Claim 29, wherein the transplanted progenitor cells act as a neural graft.

40. A method for the in vivo transplantation of progenitor cells according to Claim 30, wherein the transplanted progenitor cells act as a neural graft.

41. A method for the in vivo transplantation of progenitor cells according to Claim 31, wherein the transplanted progenitor cells act as a neural graft.

42. A method for treating neurological and neurodegenerative diseases comprising administering to a mammal in need of such treatment, a physiologically effective number of progenitor cells which have been allowed to (1) proliferate and differentiate in vitro, and are then transplanted, (2) proliferate in vitro, are then transplanted, then further proliferate and differentiate in vivo, (3) proliferate in vitro, are transplanted and differentiate in vivo, or (4) proliferate and differentiate in vivo.

43. A method for treating neurodegenerative diseases according to Claim 42, wherein the progenitor cells are derived from a heterologous donor.

44. A method for treating neurodegenerative diseases according to Claim 43, wherein the heterologous donor is a fetus.

45. A method for treating neurodegenerative diseases according to Claim 43, wherein the heterologous donor is a juvenile.

46. A method for treating neurodegenerative diseases according to Claim 43, wherein the heterologous donor is an adult.

47. A method for treating neurodegenerative diseases according to Claim 42, wherein the neurodegenerative disease is Parkinson's Disease.

48. A method for treating neurodegenerative diseases according to Claim 42, wherein the neurodegenerative disease is Alzheimer's Disease.

49. A method for treating neurodegenerative diseases according to Claim 42, wherein the neurodegenerative disease is Huntington's Chorea.

50. A method for treating neurodegenerative diseases according to Claim 42, wherein the neurodegenerative disease causes ballismus.

51. A method for treating neurodegenerative diseases according to Claim 42, wherein the neurodegenerative disease causes athetosis.

52. A method for treating neurologic diseases according to Claim 42, wherein the neurologic disease is selected from the group of schizophrenia, amyotrophic lateral sclerosis, epilepsy, cerebral palsy and stroke.

53. A method for treating neurologic diseases according to Claim 52, wherein the neurologic disease is schizophrenia.

54. A method for treating neurologic diseases according to Claim 52, wherein the neurologic disease is amyotrophic lateral sclerosis.

55. A method for treating neurologic diseases according to Claim 52, wherein the neurologic disease is epilepsy.

56. A method for treating neurologic diseases according to Claim 52, wherein the neurologic disease is cerebral palsy.

57. A method for treating neurologic diseases according to Claim 52, wherein the neurologic disease is stroke.

58. A method for treating neurodegenerative diseases according to Claim 42, wherein the progenitor cells are derived from an autologous donor.

59. A method for treating neurodegenerative diseases according to Claim 43, wherein the progenitor cells are derived from an autologous donor.

60. A method for treating neurodegenerative diseases according to Claim 44, wherein the progenitor cells are derived from an autologous donor.

61. A method for treating neurodegenerative diseases according to Claim 45, wherein the progenitor cells are derived from an autologous donor.

62. A method for treating neurodegenerative diseases according to Claim 46, wherein the progenitor cells are derived from an autologous donor.

63. A method for treating neurodegenerative diseases according to Claim 47, wherein the progenitor cells are derived from an autologous donor.

64. A method for treating neurodegenerative diseases according to Claim 42, wherein the progenitor cells are administered to a particular location in the central nervous system.

65. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the basal ganglia.

66. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the nucleus basalis of Meynert.

67. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the substantia nigra pars compacta.

68. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the globus pallidus.

69. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the subthalamic nucleus.

70. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the striatum.

71. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the brainstem.

72. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the hippocampus.

73. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the cerebral cortex.

74. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the spinal cord.

75. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the cerebellum.

76. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the retina.

77. A method for treating neurodegenerative diseases according to Claim 64, wherein the particular location is the optic tract.

78. A method for the expression of growth factors, neurotransmitters and neurotransmitter-synthesizing enzymes in progenitor cells comprising transfecting the progenitor cells with DNA expression vectors, and subsequently neurotransplanting these cells to treat neurodegenerative symptoms.

79. A progenitor cell according to Claim 5, which can be cryopreserved.

80. A method for the cryopreservation of progenitor cells comprising diluting the cells in culture medium containing glycerol, and freezing at a temperature of about -80°C or less.

81. A method for the cryopreservation of progenitor cells according to Claim 80, wherein the culture medium contains 10% glycerol.

82. A method for the in vitro proliferation of progenitor cells according to Claim 17, wherein the cells are used for the purposes of drug screening of putative therapeutic agents targeted at the nervous system.

83. A method for the continuous perpetuation of progenitor cells in suspension cultures.

84. A method for the continuous perpetuation of progenitor cells in substrate-attached cultures.

Add E4

Add A3

Add C3

Add D4